

U.S.S.N. 09/909,574

Filed: July 20, 2001

## AMENDMENT AND RESPONSE TO OFFICE ACTION

## In the Claims

1. (currently amended) A method for producing polyhydroxyalkanoates comprising providing organisms which express enzymes selected from the group consisting of acyl-CoA transferase, acyl-CoA synthetase,  $\beta$ -ketothiolase, acetoacetyl-CoA reductase, and PHA synthase, wherein the organisms are genetically engineered to express genes that encode enzymes selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, wherein ~~diol oxidoreductase and aldehyde dehydrogenase~~ the organisms can convert diols into hydroxyalkanoate monomers, ~~wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, having a weight-average molecular weight (Mw) of at least 300,000, and~~ culturing the organisms under conditions wherein the hydroxyalkanoate monomers are polymerized by the activity of a PHA synthase enzyme to form polyhydroxyalkanoates having a weight-average molecular weight (Mw) of at least 300,000 Da.
2. (original) The method of claim 1 wherein the diol is 1,6-hexanediol and the hydroxyalkanoate monomer is 6-hydroxyhexanoate.
3. (original) The method of claim 1 wherein the diol is 1,5-pentanediol and the hydroxyalkanoate monomer is 5-hydroxyvalerate.
4. (previously presented) The method of claim 1 wherein the diol is 1,4-butanediol and the hydroxyalkanoate monomer is 4-hydroxybutyrate.
5. (cancelled)

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2

MBX 039  
077832/0007

U.S.S.N. 09/909,574

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6. (previously presented) The method of claim 1 wherein the diol is 1,2-ethanediol and the hydroxyalkanoate monomer is 2-hydroxyethanoate.

7. (previously presented) The method of claim 1 wherein the diol is 1,2-propanediol and the hydroxyalkanoate monomer is 2-hydroxypropionate.

8. (currently amended) ~~A genetically engineered organism for use in the~~ The method of claim 1 ~~comprising an~~ wherein the organism ~~which expresses the~~ *aldH* and *dhaT* genes.

9. (currently amended) ~~The organism~~ method of claim 8 wherein the organism is selected from the group consisting of *Escherichia coli*, *Ralstonia eutropha*, *Klebsiella* spp., *Alcaligenes latus*, *Azotobacter* spp., and *Comamonas* spp.

10. (currently amended) A system for making polyhydroxyalkanoates comprising an organism that expresses genes that encode enzymes selected from the group consisting of [[a]] acyl-CoA transferase, acyl-CoA synthetase,  $\beta$ -ketothiolase, acetoacetyl-CoA reductase, and PHA synthase,

wherein the organism is genetically engineered to express genes that encode enzymes selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase,

wherein the organism can convert diols into hydroxyalkanoate monomers selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, which wherein the monomers are polymerized by the activity of a PHA synthase enzyme to form polyhydroxyalkanoates having a weight-average molecular weight

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3

MBX 039  
077832/0007

U.S.S.N. 09/909,574

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(Mw) of at least 300,000 Da, wherein the monomers are selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate.

11-21. (cancelled)

22-23. (cancelled)